

1. An assembly for supporting a mixer shaft in an opening in a vessel wall, the assembly comprising:

a support mounted to the vessel wall around the opening;

a seal mounted at an axial location relative to the mixer shaft;

a first bearing mounted to the support that surrounds and supports the mixer shaft at one axial location thereof; and

a second bearing mounted to the support that surrounds and supports the mixer shaft at a second axial location thereof.

2. An assembly according to claim 1, wherein the first bearing is a first tapered roller bearing and the second bearing is a second tapered roller bearing.

3. An assembly according to claim 2, wherein the first tapered roller bearing is canted at a first angle relative to an axis of the mixer shaft and the second tapered roller bearing is canted at a second angle relative to the axis of the mixer shaft.

4. An assembly according to claim 3, wherein the first and second angles are in opposite directions from each other.

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5. An assembly according to claim 4, wherein the first and second angles are of equal magnitude relative to the axis of the mixer shaft, but are in opposite direction to each other relative to the axis of the mixer shaft.

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6. As assembly according to claim 1, wherein the support structure comprises a first support portion that supports the seal ring and a second support portion that supports the first and second bearings.

7. An assembly according to claim 6, wherein the first support portion comprises a housing attached to the base that supports the first and second bearings.

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8. An assembly according to claim 7, wherein the second support portion comprises a housing attached to the base that supports the first and second bearings.

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9. An assembly according to claim 1, further comprising an inner bearing housing that surrounds a portion of the mixer shaft and is mounted to the first and second bearings.

10. An assembly according to claim 1, wherein the support, the seal, and the bearings form a removable cartridge.

11. An assembly for supporting a mixer shaft in an opening in a vessel wall, the assembly comprising:

supporting means mounted through the vessel wall around the opening;

sealing means supported by the supporting means that engages a
5 circumference of the mixer shaft with a sealing contact;

first bearing means supported by supporting means that surrounds and supports the mixer shaft at one axial location thereof; and

second bearing means supported by the supporting means that surrounds and supports the mixer shaft at a second axial location thereof.

10 12. An assembly according to claim 11, wherein the first bearing means is a first tapered roller bearing and the second bearing means is a second tapered roller bearing.

13. An assembly according to claim 12, wherein the tapered roller bearing is canted at a first angle relative to an axis of the mixer shaft and a second
15 tapered roller bearing is canted at a second angle relative to the axis of the mixer shaft.

14. An assembly according to claim 13, wherein the first and second angles are in opposite directions from each other.

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C1 } 15. An assembly according to claim 14, wherein the first and second angles are of equal magnitude relative to the axis of the supported shaft, but are in opposite directions relative to the shaft.

16. An assembly according to claim 11, wherein the supporting means comprises a first support portion that supports the seal ring and a second support portion that supports the seal ring and a second support portion that supports the first and second bearing means.

17. An assembly according to claim 16, wherein the first support portion comprises a base that is attached to the vessel wall.

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C1 } 18. An assembly according to claim 17, wherein the second support portion comprises a housing attached to the base that supports the first and second bearing means.

15 19. An assembly according to claim 11, further comprising an inner bearing housing that surrounds a portion of the shaft and is mounted to the first and second bearings.

20. An assembly according to claim 11, wherein the support, the seal, and the bearings form a removable cartridge.

21. A method for supporting a mixer shaft in an opening in a vessel wall, comprising the steps of:

sealing around the circumference of the mixer shaft at a first location of the mixer shaft to prevent material from escaping the vessel around the shaft; and

5 supporting the mixer shaft at at least second and third locations along the length of the mixer shaft to resist axial, radial, and bending loads on the shaft at the second and third locations.

22. A method according to claim 21, wherein the step of supporting the mixer shaft is performed by two bearings located at the second and third
10 locations of the mixer shaft, respectively.

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